140947

ORIGINAL (Red)

WORK PLAN FOR ADDITIONAL STUDIES FOR REMEDIAL ACTION AT CINDER BANK OPERABLE UNIT (OPERABLE UNIT 2 - PALMERTON ZINC NPL SITE) SUPPLEMENTAL AIR MONITORING

Submitted to: Horsehead Resource Development Company, Inc.
Palmerton, Pennsylvania

Project 92-118

July 1994

ORIGINAL
(Red)

HORSEHEAD RESOURCE DEVELOPMENT COMPANY, INC.
PALMERTON, PENNSYLVANIA

TITLE AND APPROVAL PAGE

FOR

WORK PLAN FOR ADDITIONAL STUDIES
FOR REMEDIAL ACTION AT
CINDER BANK OPERABLE UNIT
(OPERABLE UNIT 2 - PALMERTON ZINC NPL SITE)
SUPPLEMENTAL AIR MONITORING

JULY 1994

Precha Yodnane — 7/27/94

Precha Yodnane, Ph.D., P.E. — Date
Engineering Manager
GAI Consultants, Inc.

John Oyler — 8-1-94

John A. Oyler — Date
Project Manager
Horsehead Resource Development Company, Inc.

Frederick N. MacMillan — Date
Remedial Project Manager
U. S. Environmental Protection Agency, Region III

gai

ORIGINAL (Red)

HORSEHEAD RESOURCE DEVELOPMENT COMPANY, INC.
PALMERTON, PENNSYLVANIA

WORK PLAN FOR ADDITIONAL STUDIES FOR REMEDIAL ACTION AT CINDER BANK OPERABLE UNIT (OPERABLE UNIT 2 - PALMERTON ZINC NPL SITE) SUPPLEMENTAL AIR MONITORING

GAI CONSULTANTS, INC.
570 BEATTY ROAD
MONROEVILLE, PENNSYLVANIA 15146

PROJECT 92-118

JULY 1994

gai

TABLE OF CONTENTS

Page

gai

ORIGINAL (Red)

LIST OF FIGURES

LIST OF DRAWINGS

1.0 INTRODUCTION

The Palmerton Cinder Bank CERCLA Operable Unit No. 2 consists of approximately 33 million tons of slag-like residues and various related wastes from over 80 years of metal smelting operations. The Cinder Bank also contains a relatively small volume of municipal solid wastes (estimated to be approximately 0.03 percent by weight) from Palmerton and surrounding communities which were co-disposed with the smelting residues for about 55 years. The 2.5-mile long Cinder Bank is situated parallel to and on the foot of Blue Mountain, and is oriented in an east-west direction downwind (south) of the Palmerton zinc east plant.

According to the Record of Decision (ROD)[1], the residues have little vegetal cover to control wind and water erosion, are standing at marginally stable slopes, contain zinc, lead and cadmium, and in some locations, appear to be smoldering. Regulatory agencies, Zinc Corporation of America (ZCA) and its associate company, Horsehead Resource Development (HRD), and others are concerned about air pollution from fires burning within the Cinder Bank, and the potential for environmental damage due to wind and water erosion of heavy-metal-containing Cinder Bank residue particles, and water pollution from leaching of heavy metals out of the residues by percolate water, run-on of surface water from Blue Mountain, and infiltration of spring water.

In 1985, The United States Environmental Protection Agency (USEPA) and the New Jersey Zinc Company (now ZCA) negotiated a Consent Decree to conduct the Cinder Bank Remedial Investigation/Feasibility Study (RI/FS).[2] The 1988 ROD mandated implementation of a conceptual remediation plan for the Cinder Bank. The remedial objectives are to:

---

[1] See list of References.

1. Minimize direct contact with Cinder Bank residues;
2. Divert Blue Mountain runoff to prevent run-on water from infiltrating and eroding the Cinder Bank;
3. Reduce contaminant levels in runoff from the Cinder Bank;
4. Collect and treat runoff and seeps;
5. Reduce windborne contaminant releases from the Cinder Bank; and
6. Control internal fires within the Cinder Bank.

Specific actions called for in the ROD include:

1. Controlling fires to reduce air pollution;
2. Regrading of the Cinder Bank to more stable slopes to reduce erosion by wind and water;
3. Diverting and managing surface water to reduce run-on from Blue Mountain and to collect and treat Cinder Bank runoff; and
4. Capping (with clay and soil) and revegetating the Cinder Bank to reduce the infiltration of water into the residues, reduce wind and water erosion of residues, and isolate the residues from the public.

Since the Consent Decree was issued in 1985, additional studies of the Cinder Bank fires, successful field scale implementation of HRD's Ecoloam™ fly ash/sludge innovative capping technology on Blue Mountain, and preliminary residue recycling feasibility studies have suggested that the goals of the ROD might be met using more cost-effective measures than those specified in the ROD. In December 1991, the USEPA issued an Amendment to the Consent Decree[3] that authorizes HRD and ZCA to conduct additional studies of alternative technologies with which to meet ROD objectives.

Additional studies suggested in the Amendment are:

Item 1) Monitor emissions from Cinder Bank fires to determine whether they pose a threat to public health or the environment;

Item 2) Using hydrologic models, evaluate the effectiveness of the clay/soil cap prescribed in the ROD and alternative cap and cover scenarios, including use of an Ecoloam™ fly ash/sludge cap as both a growing medium and water barrier;

Item 3) Define the vertical and horizontal extent of fires within the Cinder Bank;

Item 4) Recommend fire control measures, if necessary, including locating fire cut-off trench(es); and,

Item 5) Evaluate the feasibility of recycling the Cinder Bank residues to recover metal and/or energy values in the residues while also meeting environmental objectives of the ROD.

HRD has retained GAI Consultants, Inc. (GAI) to conduct Study Items 1 through 4 according to the USEPA Amendment to the Consent Decree.

An air monitoring program to address Item 1 was conducted between November 17, 1992 and December 9, 1992. Based on the results of this study, as presented in the GAI Air Monitoring Report dated April 1993[4], the following conclusions were made:

- Cinder Bank vent emissions are not a source of airborne Total Suspended Particulate (TSP), heavy metals, benzene, or Polyaromatic Hydrocarbon (PAH) contamination detected at this site.
- Cinder Bank vent emissions present no significant hazard to public health or the environment.

- TSP and heavy metal contamination detected during this study are the result of windblown fugitive particulate from unvegetated areas of the Cinder Bank and vehicular traffic on the Cinder bank.
- Since airborne contaminants detected at this site are resultant from sources other than Cinder Bank vent emissions additional air monitoring at perimeter and off-site locations is not necessary.

Several problems were encountered with the sampling techniques used in this study for benzene, sulfur dioxide (SO_2), and hydrogen sulfide (H_2S). Extremely low levels of benzene were detected in all areas sampled. This indicated a vestigial contamination inherent in the sampling methodology not related to Cinder Bank vent emissions. Although SO_2 and H_2S were not detected in any area of the Cinder Bank, these results were considered to be inconclusive since the detection limit for the sampling instrumentation was not low enough to satisfy the study objectives for minimum detectable concentration.

This work plan is prepared to address only supplemental monitoring for benzene, SO_2, and H_2S required to complete Item 1, as detailed above.

2.0 WORK PLAN FOR SUPPLEMENTAL AIR MONITORING

This air monitoring plan was designed to obtain data to adequately characterize the airborne concentrations of benzene, SO_2, and H_2S within the requirements of the QAPP[8] and excluding potential contamination sources not related to Cinder Bank vent emissions.

2.1 Previous Studies

An air monitoring program was conducted at the Cinder Bank Operable Unit between November 17, 1992, and December 9, 1992, to evaluate the quality and quantity of air emissions being released from the venting portions of the Cinder Bank. This program included the characterization of TSP, heavy metals, PAHs, SO_2, H_2S, nitrogen dioxide (NO_2), and carbon monoxide (CO). The results for TSP, heavy metals, PAHs, NO_2, and CO were determined to be within the QA/QC parameters of the QAPP[8] for this work and were accepted as being representative of airborne contaminants present at this site. The sampling results for benzene, SO_2, and H_2S were inconclusive.

Benzene was found to be present in extremely low concentrations in all areas sampled. It was postulated that these results were not reliable since potential sources of benzene contamination were present within 200 feet of all sampling locations at all times in the form of gasoline-powered generators. The collection and analysis of air samples containing benzene at subpart per billion levels is extremely difficult. The previous study at the Cinder Bank utilized USEPA Method TO-1 for benzene sampling. This method involved the collection of contaminant on Tenax® adsorbent using a low flow vacuum pump. The contaminant was then extracted and analyzed by Lancaster Laboratories, Inc. Use of the T0-1 methodology for extraction and analysis, yielded a minimum detectable concentration of 0.5 ppb. This level was slightly above the target concentration of 0.1 ppb.[5]

Since this method required sampling periods of 8 to 12 hours to collect a sufficient sample volume for analysis, there were many opportunities for other contaminant sources to impact the samples.

Target concentrations (minimum detectable concentration) for SO_2 and H_2S for this study were established at 0.03 parts per million (ppm) (80 $\mu g/m^3$) and 0.7 parts per billion (ppb) (0.94 μ/m^3), respectively.[5] Due to the field limitations in the availability of utilities and the difficulties accessing sampling points and limitations in analytical methodology, portable direct reading gas analyzers were used to conduct SO_2 and H_2S monitoring.[6] The results of monitoring using this instrumentation (National Drager Model 190 Data Logger Gas Monitor) did not satisfy the study objectives for minimum detectable concentrations. The minimum detection limits for this instrumentation were 1.0 ppm for H_2S and 0.1 ppm for SO_2.

2.2 Proposed Work Plan for Benzene Sampling

To minimize the potential for collecting benzene emitted from other contaminated sources and still attempt to achieve the target minimum detectable concentration, benzene sampling will be conducted using USEPA Method T0-14.

This method involves the collection of a whole air sample (grab sample) using an evacuated SUMMA® passivated canister with subsequent analysis by gas chromatography/mass spectrometry. Using the gas chromatography/mass spectrometry analytical technique, the target minimum detectable concentration of 0.1 ppb should be achievable.

Potential benzene contamination from gasoline-powered vehicles and generators will be minimized during this sampling. Measures to be taken to minimize these potentials involve the following:

- Air sampling for benzene will be conducted separate from other air sampling;

- No gasoline-powered generators will be in use in the study area during sample collection;
- Sampling areas will be accessed by foot to conduct sampling, minimizing potential contamination from gasoline-powered vehicles; and
- Sampling will be conducted directly in the vent exhaust plume.

This sampling will be conducted in two phases. The first phase will be preliminary sampling and analysis at one venting location to validate the analytical method. Replicate grab samples will be collected using SUMMA canisters. These samples will be analyzed by Lancaster Laboratories using the T0-14 methodology to determine the actual minimum detectable concentration achievable for this study.

After the method has been validated, then the second phase will be completed. This will involve the collection of replicate grab samples at each of the six remaining active venting locations sampled during the previous study and one remote location for a background sample. These locations are identified in Drawing 92-118-F4.

In completing this work a total of two (2) field samples and one field blank would be collected during the first phase of the study. If completed, the second phase of the benzene study would involve the collection of an additional 14 grab samples and 5 field blanks.

2.3 Proposed Work Plan for Sulfur Dioxide and Hydrogen Sulfide Sampling

Sampling and analysis for SO_2 and H_2S will be conducted using direct reading pulsed-fluorescence analyzers. This type of instrumentation will yield detection limits well below those obtained from the electrochemical analyzers used in the initial study; however, they are extremely sensitive to changes in ambient temperature during the sampling period and require an electrical power source for operation.

To minimize potential problems from temperature fluctuations, air sampling will be conducted continuously only during minimal time periods required for stabilization of analyzer response (approximately 5 to 10 minutes).

Prior to and after each sampling episode, equipment will be field calibrated (as per manufacturer's instruction) to validate the sample. Zero and span drift will also be evaluated to assure they are within specifications for the instrument.

These instruments will be operated out of field vehicles using gasoline-powered generators to satisfy electric power requirements. This constraint on equipment operation may physically interfere in sampling at locations that are physically difficult to access.

Sampling for these contaminants will be conducted at each active venting location sampled during the previous study, as shown in Drawing 92-118-F4. Short-term sampling would be conducted directly in the vent in the venting exhaust plume using a Teflon tubing air sampling probe. Three separate samples for SO_2 and H_2S would be conducted at each sampling location.

2.4 Sulfur Dioxide Analysis

Sampling and analysis for SO_2 will be conducted using a Thermo Environmental Instrument Model 43A Pulsed Fluorescence Analyzer. This instrument is approved by the USEPA for ambient SO_2 monitoring (EQSA-0486-060) and has a published lower detection limit of 0.6 ppb. This detection limit is well below the study target minimum detection limit of 0.03 ppm.

2.5 Hydrogen Sulfide Analysis

Sampling and analysis for H_2S will be conducted using a Thermo Environmental Instruments Model 45 Pulsed Fluorescence H_2S Analyzer. The published lower detection limit

of the H_2S analyzer is 0.6 ppb. This detection limit is comparable to the study target minimum detection limit of 0.7 ppb.

2.6 Sampling Locations

Drawing 92-118-A6 shows the Cinder Bank site plan and general vent areas. Active vent locations are outlined in Drawing 92-118-F4. The approximate air sampling locations are also identified in Drawing 92-118-F4. SO_2 and H_2S sampling will be conducted at each study location that can be safely accessed using field vehicles.

2.7 Sampling Strategy

Air sampling for benzene, SO_2 and H_2S will be conducted directly in the vent exhaust. Field experience during the previous study demonstrated that vent spaces can be safely accessed for sampling using probed equipment. Sampling in this manner will eliminate the need to model emission rates from down-field sampling as required during the previous field study.

This modification in sampling strategy will eliminate the need for site-specific continuous monitoring of meteorological conditions. An on-site weather station will not be established during this phase of the monitoring study. Meteorological conditions measured and recorded at the HRD Research Center in Palmerton will be relied upon as required in this supplemental study.

All air sampling and analysis included in this supplemental air monitoring program will be conducted in accordance with the revised Quality Assurance Project Plan which is specific to modifications in sampling and analytical methodology required for benzene, SO_2, and H_2S.[9]

2.8 Health and Safety

Field activities will be conducted in accordance with the current Health and Safety Plan[7] with the following modification to Item 3(a) of the Health and Safety Plan Amendments:

3(a) Task 1 - Air Monitoring

1. During equipment set-up and air monitoring for benzene, SO_2, and hydrogen sulfide, Modified Level D protection is required; and

2. During the completion of vent monitoring for SO_2 and H_2S, Level C protection is required until air monitoring results indicate down-grading of protection would be acceptable.

3.0 IMPLEMENTATION SCHEDULE

The schedule for the implementation of this work plan is presented in Figure 1. The schedule allows a regulatory review period and time for incorporating comments into the Work Plan. The schedule can be adjusted as appropriate during the progress of the study as required.

4.0 SUMMARY

The scope of this work plan is limited to the specific project and location described herein, and represents GAI's understanding of significant aspects relevant to the Cinder Bank and Blue Mountain sites, coal combustion ash, stabilized sewage sludge, soils, and site residues. If there are any differences in location, and/or design features, engineering, site construction, and/or site operation as shown on the figures, or as described herein, GAI should be informed so that they may modify or revise the work plan.

Respectfully submitted,
GAI Consultants, Inc.

Precha Yodnane

Precha Yodnane, Ph.D., P.E.
Engineering Manager

H A Trout

Harry A. Trout, C.I.H., C.S.P.
Director of Health and Safety

PY/HAT:dae

gai

5.0 REFERENCES

1. U. S. Environmental Protection Agency, "Record of Decision, Palmerton Zinc Site Operable Unit II, Cinder Bank," June 29, 1988.

2. U. S. Environmental Protection Agency, "Administrative Order by Consent, Palmerton Zinc Site Cinder Bank," September 1985.

3. U. S. Environmental Protection Agency, "Amendment to Administrative Order by Consent, Palmerton Zinc Site Cinder Bank," December 13, 1991.

4. GAI Consultants, Inc., "Air Monitoring Program at Cinder Bank Operable Unit (Operable Unit 2 - Palmerton Zinc NPL Site)," April 1993.

5. GAI Consultants, Inc., "Work Plan for Additional Studies for Remedial Action at Cinder Bank Operable Unit (Operable Unit 2 - Palmerton Zinc NPL Site)," May 1992.

6. GAI Consultants, Inc., Letter to J. Oyler, "Technical Approach Modifications for Additional Studies for Remedial Actions, Cinder Bank Superfund Site, Palmerton, Pennsylvania," October 5, 1992.

7. GAI Consultants, Inc., "Site Health and Safety Plan for Additional Studies for Remedial Action at Cinder Bank Operable Unit (Operable Unit 2 - Palmerton Zinc NPL Site)," May 1992.

8. GAI Consultants, Inc., "Quality Assurance Plan for Additional Studies for Remedial Action at Cinder Bank Operable Unit (Operable Unit 2 - Palmerton Zinc NPL Site)," May 1992.

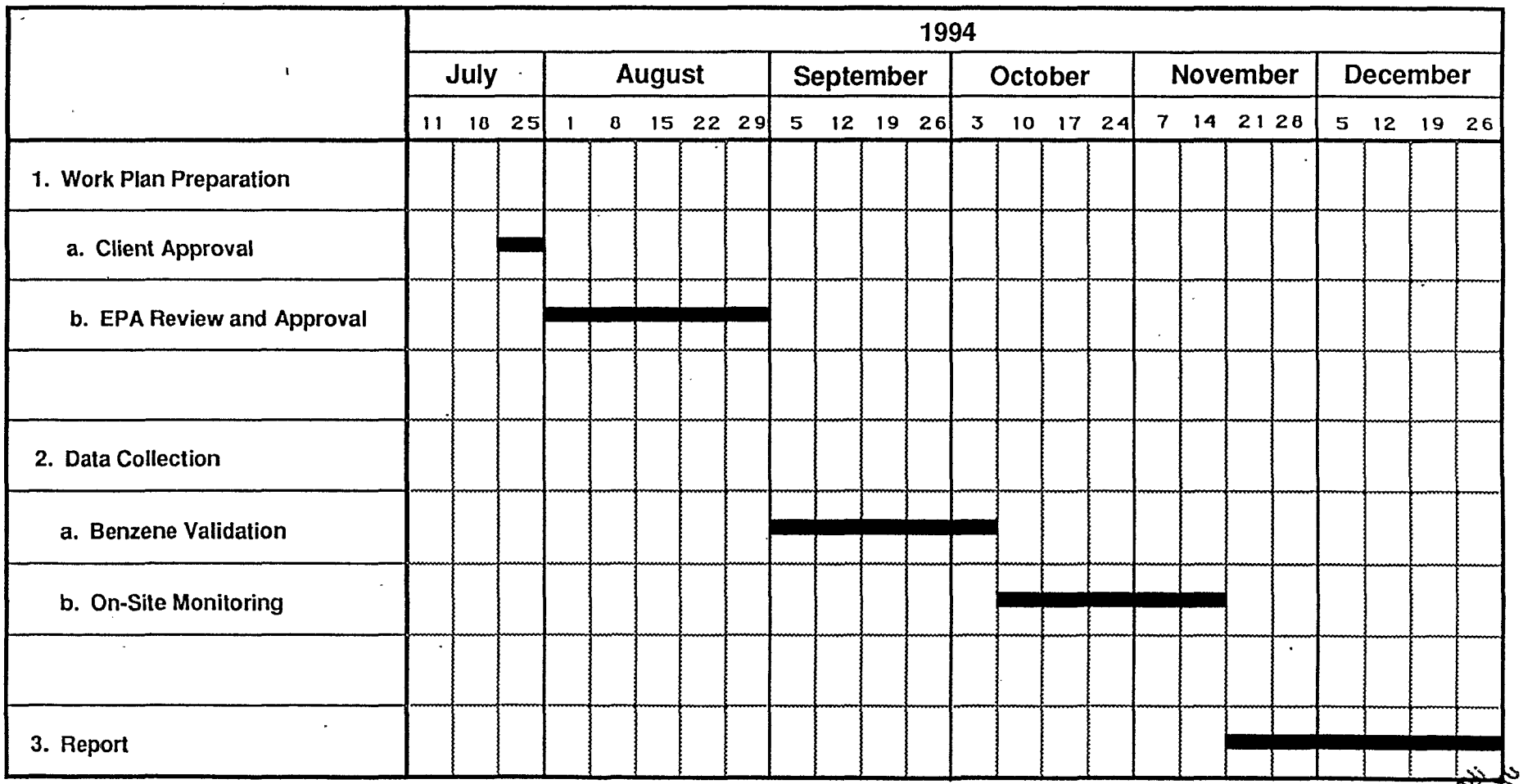
9. GAI Consultants, Inc., "Quality Assurance Plan for Additional Studies for Remedial Action at Cinder Bank Operable Unit (Operable Unit 2 - Palmerton Zinc NPL Site), Supplemental Air Monitoring," May 1994.

FIGURES

FIGURE 1

IMPLEMENTATION SCHEDULE
SUPPLEMENTAL AIR MONITORING

HORSEHEAD RESOURCE DEVELOPMENT COMPANY, INC.



DRAWINGS

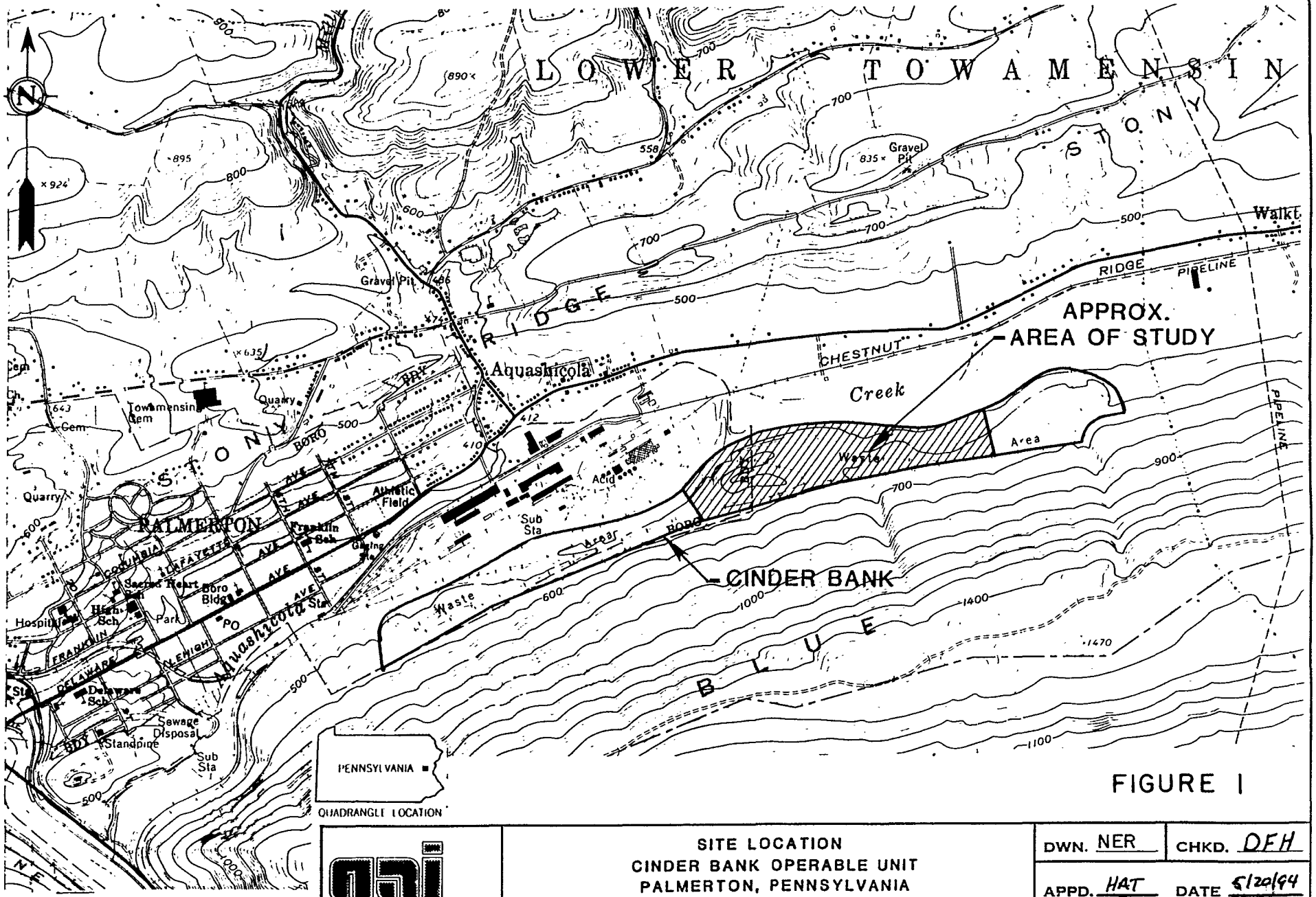


FIGURE 1

MAP REF.:
U.S.G.S. 7.5 MIN. SERIES TOPO
PALMERTON, PA. QUAD. 1960
REVISED 1970. SCALE: 1"=2000'

CONSULTANTS, INC.
Engineers • Geologists • Planners
Environmental Specialists
570 Beatty Rd. • Pittsburgh,
Monroeville, Pa. 15146
412-242-6530

SITE LOCATION
CINDER BANK OPERABLE UNIT
PALMERTON, PENNSYLVANIA

HORSEHEAD RESOURCE DEVELOPMENT CO., INC.
PALMERTON, PENNSYLVANIA

DWN. NER	CHKD. DFH
APPD. HAT	DATE 5/20/94
SCALE: 1" = 2000'	
DRAWING NUMBER 92-118-6	REV

AR303685

19 1283 HE... A. & B. SMITH CO., PGH., PA. PR 9307-1074

EPA REGION III
SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOC ID 140947
PAGE # AR 303686

IMAGERY COVER SHEET
UNSCANNABLE ITEM

SITE NAME Palmerton Zinc 042

OPERABLE UNIT

ADMINISTRATIVE RECORDS- SECTION III VOLUME E

REPORT OR DOCUMENT TITLE Work Plan for additional studies for remedial actions at cinder bank operable unit

DATE OF DOCUMENT July 1, 94

DESCRIPTON OF IMAGERY Air Sampling location Map

NUMBER AND TYPE OF IMAGERY ITEM(S) 1 oversized map